

WHAT IS CLAIMED IS:

1. A nitride-based semiconductor element comprising:
a mask layer, having a recess portion on an upper
5 surface of said mask layer, formed on a substantially flat
upper surface of an underlayer to partially expose said
upper surface of said underlayer;

a nitride-based semiconductor layer formed on said
exposed part of said underlayer and said mask layer while
10 forming a void on said recess portion of said mask layer;
and

a nitride-based semiconductor element layer, formed
on said nitride-based semiconductor layer, having an
element region.

15

2. The nitride-based semiconductor element according
to claim 1, wherein

said recess portion of said mask layer includes a
dent provided on at least part of said upper surface of
20 said mask layer.

3. The nitride-based semiconductor element according
to claim 1, wherein

said recess portion of said mask layer includes a
25 concavely curved upper surface of said mask layer.

4. The nitride-based semiconductor element according to claim 3, wherein

said mask layer has an overhanging shape, and

5 said upper surface of said overhanging mask layer is concavely curved.

5. The nitride-based semiconductor element according to claim 4, wherein

10 said overhanging mask layer includes:

a first insulator film formed on said underlayer, and

a second insulator film, formed on said first insulator film, having a smaller etching rate than said first insulator film.

15

6. The nitride-based semiconductor element according to claim 1, wherein

said underlayer includes a substrate, and

20 said mask layer is formed to be in contact with the upper surface of said substrate.

7. A nitride-based semiconductor element comprising:

a mask layer, having a recess portion on an upper surface of said mask layer, formed on projection portions of an underlayer having said projection portions on upper

25

surface on said underlayer to partially expose said upper surface of said underlayer;

a nitride-based semiconductor layer formed on said exposed part of said underlayer and said mask layer while
5 forming a void on said recess portion of said mask layer;
and

a nitride-based semiconductor element layer, formed on said nitride-based semiconductor layer, having an element region.

10

8. The nitride-based semiconductor element according to claim 7, wherein

said recess portion of said mask layer includes a dent provided on at least part of said upper surface of
15 said mask layer.

9. The nitride-based semiconductor element according to claim 7, wherein

said recess portion of said mask layer includes a
20 concavely curved upper surface of said mask layer.

10. The nitride-based semiconductor element according to claim 9, wherein

said mask layer has an overhanging shape, and
25 said upper surface of said overhanging mask layer is

concavely curved.

11. The nitride-based semiconductor element according to claim 7, wherein

5 said underlayer includes a substrate, and
 said mask layer is formed to be in contact with said upper surface of said substrate.

12. A method of forming a nitride-based semiconductor comprising steps of:

10 forming a mask layer, having a recess portion on an upper surface of said mask layer, on a substantially flat upper surface of an underlayer to partially expose said upper surface of said underlayer; and

15 growing a nitride-based semiconductor layer on said exposed part of said underlayer and said mask layer.

13. The method of forming a nitride-based semiconductor according to claim 12, wherein

20 said step of forming said mask layer includes a step of forming said mask layer on a prescribed region of said underlayer and thereafter partially etching the upper surface of said mask layer thereby forming said recess portion on the upper surface of said mask layer.

25

14. The method of forming a nitride-based semiconductor according to claim 12, wherein said step of forming said mask layer includes steps of:

5 forming a first mask material layer on part of a region of said underlayer formed with said mask layer, forming a second mask material layer to cover said first mask material layer and said underlayer, and etching said second mask material layer while leaving
10 said first mask material layer thereby forming said mask layer consisting of said first mask material layer and said second mask material layer and having said recess portion on said upper surface.

15 15. The method of forming a nitride-based semiconductor according to claim 12, wherein said underlayer includes a substrate, and said step of forming said mask layer includes a step
20 of forming said mask layer to be in contact with said upper surface of said substrate.

16. The method of forming a nitride-based semiconductor according to claim 12, further comprising a step of growing a nitride-based semiconductor element
25 layer having an element region on said nitride-based

semiconductor layer.

17. A method of forming a nitride-based semiconductor comprising steps of:

5 forming a mask layer, having a recess portion on an upper surface of said mask layer, on projection portions of an underlayer having the projection portions on upper surface for partially exposing said upper surface of said underlayer; and

10 growing a nitride-based semiconductor layer on said exposed part of said underlayer and said mask layer.

18. The method of forming a nitride-based semiconductor according to claim 17, wherein

15 said underlayer includes a substrate, and

 said step of forming said mask layer includes a step of forming said mask layer to be in contact with the upper surface of said substrate.

20 19. The method of forming a nitride-based semiconductor according to claim 17, further comprising a step of growing a nitride-based semiconductor element layer having an element region on said nitride-based semiconductor layer.

25

20. A method of forming a nitride-based semiconductor comprising steps of:

forming a mask layer having an overhanging shape on a substantially flat upper surface of an underlayer to
5 expose part of said flat upper surface of said underlayer;
and

growing a nitride-based semiconductor layer on said exposed part of said underlayer and said mask layer.

10 21. The method of forming a nitride-based semiconductor according to claim 20, wherein

said step of growing said nitride-based semiconductor layer includes a step of growing said nitride-based semiconductor layer from under said mask layer having an
15 overhanging shape and applying force from under the overhang of said mask layer thereby curving the upper surface of said overhanging mask layer.

20 22. The method of forming a nitride-based semiconductor according to claim 20, wherein

said step of forming said mask layer includes steps of:

forming a first mask material layer on said underlayer while forming a second mask material layer
25 having a smaller etching rate than said first mask

material layer on said first mask material layer, and
etching said first mask material layer and said
second mask material layer thereby forming said
overhanging mask layer having said first mask material
5 layer and said second mask material layer.

23. The method of forming a nitride-based
semiconductor according to claim 20, wherein
said underlayer includes a substrate, and
10 said step of forming said mask layer includes a step
of forming said mask layer to be in contact with the upper
surface of said substrate

24. The method of forming a nitride-based
15 semiconductor according to claim 20, further comprising a
step of growing a nitride-based semiconductor element
layer having an element region on said nitride-based
semiconductor layer.

20 25. A method of forming a nitride-based semiconductor
comprising steps of:

forming a mask layer having an overhanging shape on
projection portions of upper surface of an underlayer
having said projection portions to expose part of said
25 upper surface of said underlayer; and

growing a nitride-based semiconductor layer on said exposed part of said underlayer and said mask layer.

26. The method of forming a nitride-based semiconductor according to claim 25, wherein

said step of growing said nitride-based semiconductor layer includes a step of growing said nitride-based semiconductor layer from under said mask layer having an overhanging shape and applying force from under the overhang of said mask layer thereby curving the upper surface of said overhanging mask layer.

27. The method of forming a nitride-based semiconductor according to claim 25, wherein

said underlayer includes a substrate, and

said step of forming said mask layer includes a step of forming said mask layer to be in contact with the upper surface of said substrate.

28. The method of forming a nitride-based semiconductor according to claim 25, further comprising a step of growing a nitride-based semiconductor element layer having an element region on said nitride-based semiconductor layer.